Reasons for software failures

By Andrew Short
Overview

- Introduction
- What is failure
- Failure rates
- Failure factors
- Success factors
- Case studies
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- Success factors
- Case studies
Introduction

Does any one know the failure rate for IT projects?
Introduction

• Information system projects frequently fail. Some failure rates of large projects are reported as being between ~40% to 80%.

“This is a catastrophe. As an industry we are failing at our jobs.”

Dr. Paul Dorsey

• Much of the research in the field is performed by the Standish Group in their CHAOS report, and Top 10 Reasons Why Systems Projects Fail by Paul Dorsey.
Introduction

- Information system projects frequently **fail**. Some failure rates of **large projects** are reported as being between ~**40% to 80%**.

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Definition of failure

Cost

Quality

Time
Definition of failure

- Cost
- Quality
- Time
Requirements

Requirements

Cheap

Fast

Good
Requirements

Cheap

Fast

Good
Requirements

Choose two

Cheap

Fast

Good
Project failure rates

- Successful: 43%
- Failed: 39%
- Challenged: 18%

Project resolution from 2012 CHAOS research.
Project failure rates

39% succeeded
Delivered on time, on budget, with required features and functions.

43% challenged
Late and/or over budget, and/or with less than the required features.

18% failed
Cancelled prior to completion or delivered and never used.
In 2012 IT projects:
- 74% took longer
- 59% cost more
- 69% features delivered

Reasons for failure

**Overruns and Features**

Time and cost overruns, plus percentage of features delivered from CHAOS research for the years 2004 to 2012.

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<td><strong>Time</strong></td>
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<td><strong>Cost</strong></td>
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<td><strong>Features</strong></td>
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Reasons for failure

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- About 10% in fluctuation in failure rates
- 20% of features are frequently used
- 50% of features are hardly ever or never used
- Reduction (74%-69%) in features seen as a good thing (focusing)
Failure rates by project size

Your turn to be asked questions….

Does any one know the failure rate for **SMALL** IT projects?
Failure rates by project size

Small Projects

- Successful: 76%
- Failed: 4%
- Challenged: 20%
Failure rates by project size

Does any one know the failure rate for **LARGE** IT projects?
Failure rates by project size

Large Projects

- Successful: 10%
- Failed: 38%
- Challenged: 52%
Failure rates by project size

Project resolution for the calendar year 2012 in the new CHAOS database. Small projects are defined as projects with less than $1 million in labor content and large projects are considered projects with more than $10 million in labor content.

$1 million = ~€730,000

$10 million = ~€7.3 million
Think big, act small

- Big projects usually fail - Only 10% succeed.
- Break down into smaller parts
- Prioritise features
- Set and enforce limits
Failure factors
You need a project plan, but one of the reasons for failure is working backwards from a set finish date!

"If you fail to plan you plan to fail"

My lecturer at university

Project Plan
You need a project plan, but one of the reasons for failure is working backwards from a set finish date

“If you fail to plan you plan to fail”

My lecturer at university
Project Plan

You need a project plan, but one of the reasons for failure is working backwards from a set finish date

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My lecturer at university

Benjamin Franklin
Project Plan

Key areas of failed project plans

- Failure to perform careful analysis
- Failure to take data migration into account
- Failure to accurately assess the political climate of the organization
- Failure to enlist approval at all levels of the user community
Migrate data too late
Migrate data too late

“The data migration phase of a project can consume up to 30% of the total project resources.”

Dr. Paul Dorsey
Data Models
Data Models

We saw the data warehouse presentation the importance of planning you data structure

It’s the core of the system which everything depends on.

Check your data models with an external source
Skip testing

I FIND YOUR LACK OF TESTS

DISTURBING
Skip testing

- Not like testing a car in crash tests
- No system was ever created completely bug free
- Testing now saves time in the future
- We can only show the presence of bugs, not the absence
Buy and customise...
A lot
Buy and customise…
A lot

“The only successful way for a commercial off-the-shelf (COTS) implementation to be successful is to decide at the outset that you are going to reengineer your business to fit the limitations of the COTS business to fit the limitations of the COTS business to fit the limitations of the COTS package.”

Dr. Paul Dorsey
Other factors

• Hiring more developers to get the project done faster

• Hiring cheaper developers as expensive developers cost too much.

• Using tools and languages no one in the team is familiar with

• Not following a development methodology

• And many more!
Success factors
1. Management support
1. Management support

- Simple vision (stakeholders visions)
- Commitment (from executives)
- Blink (make decisions)
- Velocity (stepping stones / milestones)
- Education (project understanding)
- Kill switch (triggers)
- Celebrate (success)
1. Management support

**Blink**

- The larger the project, the more decisions that have to be made.
- A general rule is 1.5 decisions for every $1,000 in labor cost.
- A million-dollar project will have 1,500 decisions, while a $10 million project will have 15,000.
- The executive sponsor will be required to participate in about 20% of these decisions.
- The difference is 300 decisions versus 3,000 decisions.
2. User involvement
2. User involvement

- **Identification** (key users)
- **Rapport** (user relationship)
- **Soapbox** (communication channels)
- **Outcomes** (stepping stones / milestones)
- **Schooling** (teaching)
2. User involvement

Schooling

• Schooling is the teaching, learning, and transfer of information to and from the project team and to and from the users.
• The reason small projects have greater success is because the road is shorter with fewer exit ramps.
• Generally, in small projects there are fewer things to transfer to fewer people, yet it allows for greater creativity and breakthrough solutions.
3. Optimisation
3. Optimisation

- Scope (Prioritise tasks)
- Accurate Estimates (Estimate tasks)
- Expectations (managing)
- Butterfly Effect (big impact)
- Optimal Team (SEAL - Specialised, Exceptional, Assortment, Love)
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3. Optimisation

Butterfly Effect

• Small projects make a big impact.
• Small projects also pave the way for more small projects
• Success creates an environment that breeds further success.
• The challenge is to make sure that the organisation does not get over confident
4. Skilled resources
5. Project management expertise
6. Agile process
7. Clear objectives
8. Emotional maturity

The Emotions of Chuck Norris

- Guilt
- Suffering
- Pleasure
- Remorse
- Anger
- Kindness
- Surprise
- Desire
- Love
- Despair
9. Execution
10. Tools and infrastructure
10. Tools and infrastructure
10. Tools and infrastructure

### Time Sheet 1

| EDH-5529 | Support task March 2014 | 1h, 4h, 2h, 0.25h, 4h, 11.25h |
| EDH-5636 | Add new depot for CERN and PREVESSIN | 2h, 2h |
| EDH-5659 | Alfresco - create metadata model for DRSC | 2h, 2h |
| EDH-5673 | Create alfresco repository svn | 2h, 2h |
| EDH-5676 | Alfresco online ECM tutorial | 1h, 1h, 0.5h, 2.5h |
| EDH-5678 | Alfresco local installation | 2h |
| EDH-5679 | Alfresco project plan | 1h, 1h, 3h, 1.25h, 10.25h |
| EDH-5687 | Alfresco Meetings - April | 1h, 1h, 4h, 2h, 8h |

**Total:** 10h, 8h, 6h, 8h, 8h, 40h

### Time Sheet 2

| Andrey Avtomonov | 7h, 4h, 6h, 6h, 23h |
| Aistools internal ap links |  |
| Andrew Short | 10h, 8h, 6h, 8h, 8h, 40h |
| Daniil Meshkov | 1h, 1h |
| Dimitry Potapov | 8h, 8h, 8h, 8h, 7h, 39h |
| Guillaume Ame | 6.5h, 1h, 7.5h |

Issues in progress:
- EPW-194 Alfresco
- EDH-5676 Alfresco online ECM tutorial
- EDH-5687 Alfresco Meetings - April

Assigned to Me:
- EPW-17 MARS Changes for the new competency model
- EPW-18 EDH CCM Document v1
- EPW-65 Recruitment Request changes for the new competency model
- EPW-92 CCM release and follow up
- EPW-140 Update documentation in Confluence
- EDH-4304 MARS 2012: Modify development objectives for the reference period to support competencies
- EDH-4312 MARS 2012: Update Rpt Report
10. Tools and infrastructure
10. Tools and infrastructure
Factors of success

1. Executive management support
2. User involvement
3. Optimisation
4. Skilled resources
5. Project management expertise
6. Agile process
7. Clear business objectives
8. Emotional maturity
9. Execution
10. Tools and infrastructure
• National Health Service (NHS) (≈ Sistema Nacional de Salud)
• UK, government run
• National Program for IT (NPfIT) 2002 - 2011
• Believed to be the largest IT healthcare system in the world
• >14 billion euros spent… 14,000,000,000!
• Designed to reform the way the NHS uses data
Leadership and management changes
  • Main project leader left taking valuable expertise

Staff expressed usability concerns
  • Users involved too late
  • When finally involved they expressed serious concerns

Skills and capacity shortages
  • Left inexperienced project leaders to take over

Complexity
  • Failed to split the project into smaller tasks
  • Goals were not achievable
• Federal Bureau of Investigation (FBI)
• US, government run
• Virtual Case File (VCF) 2000 - 2005
• Would replace several older software systems
• ~123 million euros spent… 123,000,000!
• Designed to modernise IT system
Leadership and management changes and expertise
- Lack of training, experience and micromanagement
- Contributed to specification problems
- Micromanagement of software developers

Users complained system was unusable
- Users involved too late

Lack of Skilled Resources
- Personnel who had little or no training
- Lack of training, experience and micromanagement

Missing clear objectives
- Requirements were continually added to the system even as it was falling behind schedule
case study

- National Aeronautics and Space Administration (NASA)
- US, government run
- Mars Climate Orbiter 1998 - 1999
- Built by Lockheed Martin
- ~238 million euros spent
- Designed to study martian climate and atmosphere
Insufficient testing
• Testing missed failed to find the issue.

Lack of requirements understanding
• It was assumed that metric units would be used.
Your challenge

• Come in the top 39% of successful projects
• Don’t go over time or cost restrictions.
• Deliver a high quality product and improve the reputation of the IT industry.
• Don't be next years case study!
Thank you

Speaker: Andrew Short
References
References


Further reading

• List of failed software projects: http://spectrum.ieee.org/computing/software/why-software-fails

• List of failures: http://project-management.com/top-10-main-causes-of-project-failure/

• Failure of Corporate Websites: http://www.nngroup.com/articles/failure-of-corporate-websites/


Definition of failure


References: Images


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